# CLAIMS

What is claimed is:

1. A method for providing a compact layout of connected nodes, comprising:

receiving an input of a topology of connected nodes; and

arranging the topology of connected nodes into a compact layout wherein the difference between the width and the height of the compact layout is minimized.

2. The method of claim 1, wherein receiving an input of a topology of connected nodes comprises receiving data representing a hierarchical configuration of a plurality of nodes connected by a plurality of edges.

3. The method of claim 1, wherein receiving an input of a topology of connected nodes comprises receiving data representing an arbitrary configuration of a plurality of nodes connected by a plurality of edges.

4. The method of claim 1, wherein arranging the topology of connected nodes into a compact layout comprises:

recursively arranging portions of the topology of connected nodes into a plurality of compact sub-layouts each having a width and a height whose difference is minimized; and

arranging the plurality of compact sub-layouts into an overall compact layout having a width and a height whose difference is minimized.

5. The method of claim 1, wherein arranging the topology of connected nodes into a compact layout comprises:

determining a preferred width for a compact layout of the topology of connected nodes; and

arranging the topology of connected nodes into the compact layout wherein the difference between the actual width of the compact layout and the preferred width of the compact layout is minimized.

6. A computer-implemented method for providing a compact layout of connected nodes, comprising:

searching for a deepest non-leaf node along an unsearched path of edges from the root node of a hierarchical configuration of connected nodes;

positioning all descendant nodes of the deepest non-leaf node into a first compact layout, if the deepest non-leaf node is located along the unsearched path, wherein the difference between the width and the height of the first compact layout is minimized;

positioning all descendant nodes of a non-leaf sibling node of the deepest non-leaf node into a second compact layout, if the deepest non-leaf node has the non-leaf sibling node, wherein the difference between the width and the height of the second compact layout is minimized;

positioning all descendant nodes of a parent node of the deepest non-leaf node, including a sub-tree resulting from the positioning all descendant nodes of the deepest non-leaf node, into a third compact layout, if the parent node of the deepest non-leaf node is not the root node, wherein the difference between the width and the height of the third compact layout is minimized;

repeating, for each path of edges from the root node, the foregoing steps of (a) searching for a deepest non-leaf node, (b) positioning all descendant nodes of the deepest non-leaf node, (c) positioning all descendant nodes of a non-leaf sibling node, and (d) positioning all descendant nodes of a parent node; and

positioning all descendant nodes of the root node, including all child sub-trees of the root node resulting from the repeating, into a fourth compact layout wherein the difference between the width and the height of the fourth compact layout is minimized.

7. The computer-implemented method of claim 6, wherein positioning all descendant nodes of the deepest non-leaf node into a first compact layout comprises:

calculating a total area of the all descendant nodes of the deepest non-leaf node;

calculating a preferred width of the first compact layout as the square root of the total area; and

positioning the all descendant nodes of the deepest non-leaf node into the first compact layout wherein the difference between the actual width and the preferred width of the first compact layout is minimized.

8. The computer-implemented method of claim 6, wherein positioning all descendant nodes of a non-leaf sibling node of the deepest non-leaf node into a second compact layout comprises:

calculating a total area of the all descendant nodes of the non-leaf sibling node;

calculating a preferred width of the first compact layout as the square root of the total area; and

positioning the all descendant nodes of the non-leaf sibling node into the second compact layout wherein the difference between the actual width and the preferred width of the first compact layout is minimized.

9. The computer-implemented method of claim 6, wherein positioning all descendant nodes of a parent node of the deepest non-leaf node into a third compact layout comprises:

calculating a total area of all descendant nodes of the parent node, including the area of the sub-tree resulting from the positioning all descendant nodes of the deepest non-leaf node;

calculating a preferred width of the third compact layout as the square root of the total area; and

positioning the all descendant nodes of the parent node into the third compact layout wherein the difference between the actual width and the preferred width of the third compact layout is minimized.

10. The computer-implemented method of claim 6, wherein positioning all descendant nodes of the root node into a fourth compact layout comprises:

calculating a total area of all descendant nodes of the root node, including the area of each child sub-tree of the root node resulting from the repeating;

calculating a preferred width of the fourth compact layout as the square root of the total area; and

positioning the all descendant nodes of the root node into the fourth compact layout wherein the difference between the actual width and the preferred width of the fourth compact layout is minimized.

11. A computer system for providing a compact layout of connected nodes, comprising:

a processing unit;

a memory in communication with the processing unit; and

a computer program stored in the memory that provides instructions to the processing unit, wherein the processing unit is responsive to the instructions, operable for:

receiving an input of a topology of connected nodes;

recursively arranging portions of the topology of connected nodes into a plurality of compact sub-layouts each having a width and a height whose difference is minimized; and

arranging the plurality of compact sub-layouts into an overall compact layout having a width and a height whose difference is minimized.

12. The computer system of claim 11, wherein the processing unit, responsive to the instructions, is further operable for:

receiving a selection of a layout format for the plurality of compact sub-layouts and the overall compact layout, wherein the layout format determines the routing of the connectors to the connected nodes; and

receiving a selection of a preferred spacing for the connected nodes and the connectors within the plurality of compact sub-layouts and the overall compact layout.

13. The computer system of claim 11, wherein the processing unit, responsive to the instructions, is operable for receiving an input of a topology of connected nodes by:

reading a data structure representing a hierarchical configuration of a plurality of nodes connected by a plurality of edges; and

organizing the hierarchical configuration into a tree layout format for further processing.

14. The computer system of claim 11, wherein the processing unit, responsive to the instructions, is operable for receiving an input of a topology of connected nodes by:

reading a graph of data representing an arbitrary configuration of a plurality of nodes connected by a plurality of edges; and

organizing the arbitrary configuration into a tree layout format for further processing..

15. The computer system of claim 11, wherein the processing unit, responsive to the instructions, is operable for recursively arranging portions of the topology of connected nodes into a plurality of compact sub-layouts by:

determining a preferred width of the compact sub-layout for each portion based on the square root of the total area of the connected nodes for the each portion; and

arranging the connected nodes of the each portion into a compact sub-layout wherein the difference between the actual width and the preferred width of the compact sub-layout is minimized.

16. The computer system of claim 11, wherein the processing unit, responsive to the instructions, is operable for arranging the plurality of compact sub-layouts into an overall compact layout by:

determining a preferred width of the compact layout based on the square root of the total area of the plurality of compact sub-layouts; and

arranging the plurality of compact sub-layouts into a compact layout wherein the difference between the actual width and the preferred width of the compact layout is minimized.

17. A computer-readable medium having computer-executable instructions for providing a compact layout of connected nodes, comprising:

logic for receiving an input of data representing a hierarchical configuration of connected nodes;

logic for locating a deepest internal node along an unsearched path of branches from the root node of the hierarchical configuration of connected nodes;

logic for arranging all descendant nodes of the deepest internal node into a first compact layout wherein the ratio between the width and the height of the first compact layout is optimized toward a first preferred aspect ratio;

logic for arranging all descendant nodes of a parent node of the deepest internal node, including a sub-tree formed by the deepest internal node and the first compact layout, into a second compact layout wherein the ratio between the width and the height of the second compact layout is optimized toward a second preferred aspect ratio; and

logic for arranging all descendant nodes of the root node, including all resultant child sub-trees of the root node, into a third compact layout wherein the ratio between the width and the height of the third compact layout is optimized toward a third preferred aspect ratio.

18. The computer-readable medium of claim 17, further comprising:

logic for receiving a selection of the first, second, and third preferred aspect ratios for the ratio of the width to the height of the first, second, and third compact layouts, respectively;

logic for receiving a selection of a layout format for the first, second, and third compact layouts, wherein the layout format determines the routing of the branches to the connected nodes; and

logic for receiving a selection of a preferred spacing for the connected nodes and the branches within the first, second, and third compact layouts.

19. The computer-readable medium of claim 17, wherein the logic for arranging all descendant nodes of the deepest internal node into a first compact layout comprises:

logic for calculating a total area of the all descendant nodes;

logic for calculating a preferred width of the first compact layout as the square root of the total area; and

logic for arranging the all descendant nodes into the first compact layout wherein the difference between the actual width and the preferred width of the first compact layout is minimized.

20. The computer-readable medium of claim 17, wherein the logic for arranging all descendant nodes of a parent node of the deepest internal node comprises:

logic for calculating a total area of all descendant nodes of the parent node, including the area of the sub-tree formed by the deepest internal node and the first compact layout;

logic for calculating a preferred width of the second compact layout as the square root of the total area; and

logic for arranging the all descendant nodes of the parent node into the second compact layout wherein the difference between the actual width and the preferred width of the second compact layout is minimized.

21. The computer-readable medium of claim 17, wherein the logic for arranging all descendant nodes of the root node comprises:

logic for calculating a total area of all descendant nodes of the root node, including the area of each resultant child sub-tree of the root node;

logic for calculating a preferred width of the third compact layout as the square root of the total area; and

logic for arranging the all descendant nodes of the root node into the third compact layout wherein the difference between the actual width and the preferred width of the third compact layout is minimized.